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EXAMINER	
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/525,686
Filing Date: February 22, 2005
Appellant(s): KIRCHHOFF ET AL.

Derek S. Jessen
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 07/06/2010 appealing from the Office action mailed 05/19/2010.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 4107244	Ochiai	AUG 1978
US 2002/0158368	Wirth	OCT 2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-7, and 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,107,244 (Ochiai) in view of US 2002/0158368 (Wirth). Ochiai discloses a "Method and apparatus for repairing damaged surface of refractory lined vessel," (title). In order to identify areas in need of repair, Ochiai teaches using a microwave transmitter or a laser emitter (col. 4 lines 19-24; col. 5 lines 1-43). Ochiai teaches (column 4 line 30) that the measuring device measures the residual thickness of the lining. "The distance *r* from the reference position to the surface of the wear lining 3 is obtained by detecting the phase difference between the transmission wave and reception wave, and is stored in the memory operation circuit 13 together with the signal of the position. Ochiai teaches the use of a processing unit that transforms the thickness data into binary data (column 6 line 63- column 7 line 3, column 5 lines 18-26). The values *r* and r_0 taught by Ochiai are binary and are taken to be the claimed "1 and 0" values. Ochiai teaches combining these areas into areas having thickness below the threshold value (column 4 lines 30-46). Ochiai teaches that there is a step that computes the position (column 4 lines 30-36) and repair sequence (column 5 lines 16-25) of each of the combined areas and transfers these data to a repair device and

applying material onto the combined areas computed by the processing unit (claims 1 and 10).

Ochiai does not teach that an adjacent combined area has a portion which was identified as not needing repair according to the threshold value. Wirth teaches a method for repairing refractory vessels (abstract). Wirth teaches assigning a matrix value for the areas of the vessel [0046]. Such use of a matrix assigns isolated positions with a corresponding matrix position. Wirth teaches that in such a matrix there are areas that need repair and other areas that do not [0046]. Thus Wirth teaches that an adjacent combined area has a portion having a value which indicates that the portion had a measured residual thickness which was equal to or higher than the predetermined .threshold value. It would have been obvious to one having ordinary skill in the art at the time of the invention to use the matrix method of Wirth in the invention of Ochiai motivated by a desire to use a linear algebra based algorithm for deciding which areas need repair.

Claims 2-4, 6, 10, and 11:

The limitation in claim 2 is addressed in the title "… Refractory Lined Vessel" of the Ochiai patent. As for claims 3 and 4, Ochiai states in the background section (line 14,): " The refractory lined vessels referred to in this invention are ladles, torpedo cars, mixers, converters, electric furnaces, spare or additional refining furnaces, and the like which are used in the steel making." The method of Ochiai is used on metallurgical vessels as claimed by the applicant. This method employs a non-contact measuring device such as a laser (addressing claim 6) or microwaves (column 4 line 67). The

controller, which is labeled element (19, Ochiai figure 6), electronically connects the measuring and repairing devices. This connection addresses applicant claim 10. Being that these devices are electronic, applicant claim 11 is hereby addressed.

Claims 5 and 7

With respect to claim 5, while Ochiai is silent on the particular ladle to be repaired, the repair of any ladle according to the Ochiai invention would be the same regardless to the particular use of the ladle. All of the ladles recited in applicant claim 5 have identical structures and would therefore be repaired in the same fashion. For these reasons, it would have been obvious in the art to use the repair operation suggested by Ochiai for repairing the particular ladles recited in this claim since the repair operation suggested by Ochiai would be equivalently applicable.

With respect to claim 7, Ochiai discloses using a laser-based measuring device. One skilled in the art would have known a mirror scanner to be in operation at the time of the invention. An artisan would have reasonably recognized and appreciated that that a mirror scanner is functionally equivalent to the scanning laser suggested by Ochiai. That is, the mirror scanner would be effective in detecting defect in a liner by scanning through an inner wall of a lined vessel and obtain a profile measurement distance of the inner wall. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use a mirror scanning laser instead of a laser device as such is an art recognized effective means for detecting defect of a lined inner wall of a vessel.

Claims 12 and 13:

Wirth addresses applicant claims 12 and 13. In paragraph [0038] Wirth recites:" …laser reader 706 is used to acquire the point cloud… the point cloud represents the dimensions of the interior of the vessel as recognized by a person of ordinary skill in the art." Later (Wirth) discloses [paragraph 0046]: "The data extracted from the point cloud is compared with the reference vessel characteristics to establish the deficiencies in the vessel lining. With these deficiencies defined, corresponding matrix data is generated and stored in predefined matrices." The point cloud may be defined in three-space coordinates $f(x, y, z)$ or in terms of a cylinder by $f(\rho, \varphi, z)$ with mathematical manipulation. It would be obvious to one having ordinary skill in the art at the time of the invention to use mathematical manipulation such as defining the defects in three-space coordinates $f(x, y, z)$ or in terms of a cylinder by $f(\rho, \varphi, z)$ in order to map the defined defective areas to a computer in order to develop a repair program. Wirth also uses computer programs and geometry [paragraph 0045] in order to create simulations in 3-space. These simulations are used in calibration and repair paragraph 0046, 0101].

Claims 14 and 15:

Wirth discloses in the abstract: "The disclosed systems and methods further include means for comparing the 3D geometric data corresponding to the interior of the vessel with 3D geometric data provided as a reference, generating a 3D repair trace based on the comparison, and controlling a spray gun for applying refractory material according to the trace by taking into account a set of physical variables related to the vessel and the refractory material." The 3-D reference taught here is analogous to the simulation described in the applicant claims 14 and 15. This information is discussed again in

paragraph [0028]. The device computes the difference between the reference and the actual vessel in order to judge repair performance. One would appreciate the combined teachings or Ochiai and Wirth to repair vessels. It would also be obvious to one having ordinary skill in the art at the time of the invention to create a simulation program in order to calibrate the repair program or to measure the extent of the repair performed

3. Claims 8 and 9 rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,107,244 (Ochiai) in view of US 2002/0158368 (Wirth) as applied to claim 1 and in further view of US Patent 4,690,328 (Roehl).

Ochiai addresses the movement of the device (Ochiai, claims 4 and 5). Not disclosed by Ochiai is whether or not the device is tilt-able. Roehl discloses a portable device for the repair of refractory linings that, according to the abstract, has an arm universally pivoted on a frame (abstract; col. 1 lines 28-32; col. 4 lines 50-65; figure 4). This arm is further described in the abstract as having a spray nozzle on the outer end. The device mentioned by Ochiai is intended to reach all areas of the refractory lining needing repair and is movable to accomplish such a purpose. Roehl uses a tilting mechanism in order to accomplish the same purpose. This is why one skilled in the art would recognize a tilting means as another means to move the device in order to accomplish the aforementioned task. It would have been obvious to one skilled in the art at the time of the invention to provide a tilting mechanism on a device of Ochiai in order to enhance the versatility of the device of Ochiai and to enable it to repair effectively lined vessel in a hard to reach area.

(10) Response to Argument

4. Appellant arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

5. Appellant argues that Ochiai does not teach a defragmenting step which combines areas in need of repair with adjacent areas not in need of repair. The matrix method taught by Wirth takes into account all areas of the vessel and includes areas that need no repair.

$$\begin{bmatrix} 100 & 100 & 50 & 50 \\ 50 & 100 & 100 & 100 \\ 50 & 50 & 100 & 100 \\ 50 & 50 & 50 & 100 \end{bmatrix} = \begin{bmatrix} (1,1) & (1,2) & (1,3) & (1,4) \\ (2,1) & (2,2) & (2,3) & (2,4) \\ (3,1) & (3,2) & (3,3) & (3,4) \\ (4,1) & (4,2) & (4,3) & (4,4) \end{bmatrix}$$

The matrices above represent those suggested by Wirth [0046]. Here it can be seen that the adjacent areas include areas that need not be repaired.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/DAVID N. BROWN II/

Examiner, Art Unit 1791

/Y. N. G./

Supervisory Patent Examiner, Art Unit 1791

/Anthony McFarlane/